

What is claimed is:

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1           1.    A method for fabricating a SnO<sub>2</sub> gate ISFET  
2 device, comprising steps of:

3           providing a semiconductor substrate;

4           forming a virtual gate on the semiconductor  
5 substrate to define the gate area of the ISFET;

6           forming a source/drain in the semiconductor  
7 substrate beside the virtual gate;

8           removing the virtual gate;

9           forming a SnO<sub>2</sub> gate in the gate area to form an  
10 ISFET.

1           2.    The method as claimed in claim 1, wherein  
2 forming the virtual gate to define the gate area of the  
3 ISFET further comprises:

4           rinsing the semiconductor substrate;

5           forming a pad oxide layer on the semiconductor  
6 substrate; and

7           removing a portion of the oxide layer to form a  
8           virtual gate to define the gate area.

1           3.    The method as claimed in claim 2, wherein  
2           forming the  $\text{SnO}_2$  gate in the gate area comprises:

3           coating a solution comprising  $\text{SnCl}_2 \cdot 2\text{H}_2\text{O}$  and ethanol  
4           on the surface of the gate oxide layer of the ISFET; and

5           heating the semiconductor substrate to a  
6           predetermined temperature for a predetermined time  
7           interval.

1           4.    The method as claimed in claim 1, wherein  
2           forming the source/drain beside the virtual gate further  
3           comprises doping the semiconductor substrate by the  
4           virtual gate as a mask to form a source/drain.

1           5.    The method as claimed in claim 3, wherein the  
2           concentration of the solution comprising  $\text{SnCl}_2 \cdot 2\text{H}_2\text{O}$  and  
3           ethanol is 0.37M.

1           6.    The method as claimed in claim 3, wherein the  
2           predetermined temperature ranges from  $350^\circ\text{C}$  to  $400^\circ\text{C}$ .

1           7.    The method as claimed in claim 3, wherein the  
2           predetermined interval is one hour.

1           8.    The method as claimed in claim 1, wherein the  
2    thickness of the SnO<sub>2</sub> gate is at least 1000Å.